

Chapter 2

Summary of Major Issues Identified During the Comment Periods and Changes to the SPD Draft EIS

The following paragraphs highlight comments and issues that the public raised concerning information provided in the SPD Draft EIS. These comments were collected during the two separate public comment periods for the SPD Draft EIS and the *Supplement*. Changes made to this SPD EIS in response to a comment are described.

2.1 Summary of Major Issues Raised on the SPD Draft EIS During the Public Comment Period

Russian Disposition Program. A number of commentors expressed concern over Russian disposition activities and tying U.S. activities to Russian activities. The United States and Russia recently made progress in the management and disposition of plutonium. In July 1998, Vice President Gore and Russian Prime Minister Sergei Kiriyenko signed a 5-year agreement to provide the scientific and technical basis for decisions concerning how surplus plutonium will be managed. In September 1998, Presidents Clinton and Yeltsin held a Moscow summit and signed a statement of principles with the intention of removing approximately 50 t (55 tons) of plutonium from each country's stockpile. The United States does not currently plan to implement a unilateral program; however, it will retain the option to begin certain disposition activities in order to encourage the Russians and set an international example. DOE has updated this SPD EIS to reflect the agreement and statement of principles and included copies in Appendix A of Volume II.

Site Selection. A large number of comments were received advocating one candidate site over another for various reasons, including the presence of existing facilities that could prove beneficial to plutonium disposition, skilled workers, safety records, reduced transportation, and perceived economic benefits. DOE has chosen SRS as its preferred site for the three surplus plutonium disposition facilities, as outlined in Section 1.6.

Approach to Plutonium Disposition. A number of commentors protested DOE's preference for the hybrid approach and the use of MOX fuel for surplus plutonium disposition. Among the comments received on this issue were many advocating the use of the immobilization approach for all of the surplus plutonium. Commentors argued that the immobilization approach was safer, cheaper, and faster. They also pointed out that the immobilization approach resulted in less transportation. Because specific reactors in North Carolina, South Carolina, and Virginia have been proposed for plutonium disposition, the transportation requirements associated with several hybrid alternatives that include the MOX facility at SRS and Pantex have decreased (because the proposed reactors are closer to these sites than the 4,000-km [2,500-mi] bounding distance analyzed in the SPD Draft EIS). As a result, these hybrid alternatives would require less transportation than some of the 50-t (55-ton) immobilization alternatives. Other commentors viewed the MOX approach as a Federal Government subsidy of the commercial nuclear power industry. Use of MOX fuel in domestic, commercial reactors is not proposed in order to subsidize the commercial nuclear power industry. Rather, the purpose is to safely and securely disposition surplus plutonium by meeting the Spent Fuel Standard.¹

Safety and Health. Comments were received that questioned the safety and health aspects of operating the surplus plutonium disposition facilities. Commentors pointed out that DOE's safety record at other nuclear facilities had been poor in the past and questioned DOE's ability to safely operate the disposition facilities. The health and safety of workers and the public is a priority of the surplus plutonium disposition program, regardless

¹ "Spent Fuel Standard" is a term coined by the National Academy of Sciences (NAS, 1994, *Management and Disposition of Excess Weapons Plutonium*, National Academy Press, Washington, D.C., pg. 12) and modified by DOE (glossary from Office of Fissile Materials Disposition Web site at <http://www.doe-md.com>) denoting the main objective of alternatives for the disposition of surplus plutonium: that such plutonium be made roughly as inaccessible and unattractive for weapons use as the much larger and growing stock of plutonium in civilian spent nuclear fuel.

of which approach is chosen. Operation of the disposition facilities would comply with applicable Federal, State, and local laws and regulations governing radiological and hazardous chemical releases. Within these limits, DOE believes that the radiation exposure and the level of contamination should be kept as low as is reasonably achievable.

Aqueous Processing of Plutonium. Some commentors questioned DOE's ability to produce clean plutonium dioxide that could be used in MOX fuel using the dry process proposed in the SPD Draft EIS. Questions were raised about the ability of this process to remove gallium and other pit materials from the plutonium before it is fabricated into MOX fuel. On the basis of public comments received on the SPD Draft EIS and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing (a small-scale aqueous process) as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N (which addressed plutonium polishing in the SPD Draft EIS) was deleted from this SPD Final EIS, and the impacts discussed therein were included in the impacts presented for the MOX facility in Chapter 4 of Volume I. Section 2.4.3 was also revised to include a discussion of plutonium polishing.

No attempt was made to evaluate the use of DOE's existing aqueous processing lines capable of dissolving pits, as advocated by some commentors. DOE determined that such aqueous processing, while a proven technology, is not a reasonable alternative for pit conversion because current aqueous processes using existing facilities would produce significant amounts of waste, and aqueous processing would complicate international inspection regimes because of classification issues.

Reprocessing. Several comments were received related to the reprocessing of plutonium and the civilian use of plutonium. The use of U.S. surplus plutonium in existing domestic, commercial reactors does not involve reprocessing. The proposed use of MOX fuel is consistent with the U.S. nonproliferation policy and would ensure that plutonium that was produced for nuclear weapons and subsequently declared excess to national security needs is never again used for nuclear weapons. The MOX facility would be built and operated subject to the following strict conditions: construction would take place at a secure DOE site, it would be owned by the U.S. Government, operations would be limited exclusively to the disposition of surplus plutonium, and the MOX facility would be shut down at the completion of the surplus plutonium disposition program. At the end of the useful life of the facility, DOE would evaluate options for D&D or reuse of the facility for other purposes.

Inclusion of Generic Reactor Information in the SPD Draft EIS. Many comments were received on the inclusion of generic reactor information in the SPD Draft EIS. At the time the SPD Draft EIS was released, DOE did not know which specific reactors would be proposed for the MOX program. Subsequently, the Catawba, McGuire, and North Anna reactors were chosen as part of the contractor team that would implement the MOX option should the decision be made in the SPD EIS ROD to go forward with the hybrid approach (i.e., both immobilization and MOX). Specific reactor information provided as part of the procurement process was evaluated by DOE in an Environmental Critique in accordance with DOE's NEPA regulations at 10 CFR 1021.216. The Environmental Critique was considered by DOE before awarding the contract. An Environmental Synopsis based on the Environmental Critique was prepared and released to the public for comment in the *Supplement*. The comments received on the *Supplement* are summarized and responded to in Volume III, Chapter 4, of the Comment Response Document. An opportunity for public comment will also likely be provided by NRC during the reactor operating license amendment process.

Transportation Concerns. Commentors raised concerns about the transportation involved with moving the surplus plutonium from storage locations to disposition sites and, in some cases, MOX fuel to reactor sites. Requests were made to limit the transportation where possible, to present the transportation information in a more understandable manner, and to ensure that the transportation was conducted as safely as possible. Additional information has been added to Chapter 2 of Volume I, of this SPD Final EIS, which shows the total transportation associated with each alternative and gives a graphic depiction of the transportation needed for each disposition

approach (immobilization and MOX). As discussed in this SPD EIS, safe transportation is a major concern of DOE. All shipments of surplus plutonium would be accomplished using the safe, secure trailer/SafeGuards Transport (SST/SGT) system.² Since the establishment of the DOE Transportation Safeguards Division in 1975, the SST/SGT system has transported DOE-owned cargo over more than 151 million km (94 million mi) with no accidents that resulted in a fatality or release of radioactive material.

Cost of Plutonium Disposition. Many commentors focused on the cost of various surplus plutonium disposition facilities. Because cost issues are beyond the scope of this SPD EIS, commentors are referred to DOE's *Cost Analysis in Support of Site Selection for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0009, July 1998) and *Plutonium Disposition Life Cycle Costs and Cost-Related Comment Resolution Document* (DOE/MD-0013, November 1999). Comments concerning the basis for DOE's cost estimates or requesting cost information were forwarded to DOE's cost analysis team.

2.2 Summary of Major Issues Raised on the Supplement to the SPD Draft EIS During the Public Comment Period

Frequency of Reactor Accidents in Reactors Using MOX Fuel. A number of comments argued that the frequency of reactor accidents would be greater due to the use of MOX fuel. As reflected in the accident analysis included in Section 4.28, the consequences of a beyond-design-basis accident using MOX fuel are generally higher than those expected in the same reactor using low-enriched uranium (LEU) fuel. However, there is no basis for concluding that the frequency of these accidents would increase due to the use of MOX fuel. During the base contract period, the contractor team would work with the utilities to confirm the characteristics of the MOX fuel and whether any design modifications are necessary to maintain safety margins. No change in the frequencies of reactor accidents due to the use of MOX fuel has been made in this SPD Final EIS.

Risk Associated With Reactors Using MOX Fuel. Many commentors were concerned that there is an increase in accident risk from reactors using MOX fuel and that the plutonium in MOX fuel makes a reactor accident more dangerous to human health. There are differences in the expected risk of reactor accidents from the use of MOX fuel. Some accidents would be expected to result in lower consequences to the surrounding population, and thus, lower risks, while others would be expected to result in higher consequences and higher risks. The largest estimated increase in risk to the surrounding population due to the use of MOX fuel is an estimated 14 percent increase in the risk of latent cancer fatalities associated with an interfacing systems loss-of-coolant at North Anna. The likelihood of this accident occurring at North Anna is estimated to be one chance in 4.2 million per year. Before any MOX fuel is used for plutonium disposition, NRC would perform a comprehensive safety review that would include information prepared by the reactor plant operators as part of their license amendment applications. Expected risk is discussed in Section 4.28 of this SPD EIS.

Environmental Impacts Associated With Using MOX Fuel Versus LEU Fuel. Comments were received expressing a concern that the SPD Draft EIS failed to recognize avoided environmental impacts associated with using MOX fuel versus LEU fuel in existing commercial reactors. While the consequences of a beyond-design basis accident might be higher (as discussed above), and a slight increase in spent fuel could be expected by using MOX fuel instead of LEU fuel, the impacts associated with mining, milling, and enriching uranium are avoided. Section 4.28.3 has been added to this SPD Final EIS to address this issue.

² The SST/SGT is a specially designed component of an 18-wheel tractor-trailer vehicle. Although the details of the vehicle enhancements are classified, key characteristics are not, and include: enhanced structural supports and a highly reliable tie-down system to protect cargo from impact; heightened thermal resistance to protect the cargo in case of fire; deterrents to protect the unauthorized removal of cargo; couriers who are armed Federal officers and receive rigorous training and are closely monitored through DOE's Personnel Assurance Program; an armored tractor to protect the crew from attack; advanced communications equipment; specially designed escort vehicles containing advance communications and additional couriers; 24 hr-a-day real-time monitoring of the location and status of the vehicle; and significantly more stringent maintenance standards.

Low-Level Waste. Comments were received on the isotopic breakdown of the low-level waste (LLW) that would be generated at the reactors using MOX fuel and the effect of this waste on existing burial grounds. There are differences in fission product inventories and activation products between an LEU and MOX core during a fuel cycle. However, the only time significant quantities of fission products could be released to the environment or end up in LLW would be in the event of a large-scale fuel leak. In regard to normal operations, experience with fabricating MOX fuel indicates a leakage rate of less than one-tenth of one percent. The use of MOX fuel would not be expected to result in any additional LLW because the reactors would continue to operate on the same schedule as if they were using only LEU fuel.

Public Hearings. A number of comments were received regarding the need to hold public hearings near the proposed reactor locations. DOE's NEPA regulations require that at least one public hearing be held to receive comments on a draft EIS (10 CFR 1021.313[b]). A public hearing was held in Washington, D.C., to collect public comments on the *Supplement*. No additional hearings were held near the specific reactor sites, but comments were solicited in the areas surrounding the proposed reactors. The *Supplement* was sent to interested groups and individuals near each of the reactors and an informational meeting about the proposed use of MOX fuel, sponsored by a South Carolina State Senator, was attended by DOE during the comment period. The transcript of this meeting is presented as Appendix A of the Comment Response Document.

2.3 Changes to the SPD Draft EIS and the *Supplement*

DOE revised the SPD Draft EIS and its *Supplement* in response to comments received from other Federal agencies; tribal, State, and local governments; nongovernmental organizations; the general public; and DOE reviews. The text was changed to provide additional environmental baseline information, reflect new technical data, make editorial corrections, respond to comments, and clarify text. Some of these changes involved recalculations of the impacts discussed in Chapter 4 of Volume I. In addition, DOE updated information due to events or decisions made since the SPD Draft EIS and *Supplement* were provided for public comment. Sidebars are used throughout this SPD Final EIS to indicate where changes have been made. Below is a brief discussion of significant (e.g., noneditorial) changes.

Revised Preferred Alternative. In the SPD Draft EIS, DOE's preferred alternative for siting the proposed disposition facilities was identified as either Alternative 3 (the pit conversion, immobilization, and MOX facilities at SRS) or Alternative 5 (the pit conversion facility at Pantex and the immobilization and MOX facilities at SRS). Under either alternative, the hybrid approach (i.e., immobilization and MOX) was preferred with the immobilization technology being the can-in-canister approach. No preference was identified in the SPD Draft EIS for the lead assembly or postirradiation examination activities, nor were the specific reactors that would use MOX fuel identified.

The *Supplement* identified SRS as the preferred site for the construction and operation of the pit conversion, immobilization, and MOX facilities. The *Supplement* also identified LANL as the preferred site for lead assembly activities and ORNL as the preferred site for postirradiation examination activities. Section 1.6 of this SPD Final EIS now identifies Alternative 3 as DOE's preferred alternative. In addition, Section 2.1.3 now identifies the three reactor sites that have been named as candidates for using MOX fuel subject to NRC license amendment. They are the Catawba Nuclear Station in York County, South Carolina; the McGuire Nuclear Station in Mecklenburg County, North Carolina; and the North Anna Power Station in Louisa County, Virginia.

Changes to the Immobilization Facility. Since the issuance of the SPD Draft EIS and as described in the *Supplement*, DOE has developed a more detailed conceptual design for the can-in-canister immobilization facility. Changes in the size of the immobilization facility have been reflected in Volume I, Chapter 2, of this SPD Final EIS and the associated impact analyses throughout Chapter 4. No changes have been made to the

basic processes proposed in the SPD Draft EIS for immobilization, to the amount of material being considered for immobilization, or to the rate of throughput.

As stated in the *Supplement*, the eight alternatives that included using portions of Building 221–F at SRS for immobilization (SPD Draft EIS Alternatives 3B, 5B, 6C, 6D, 7B, 9B, 12B, and 12D) were eliminated. These alternatives are no longer reasonable because the amount of new construction required for the proposed immobilization facility is now nearly the same whether the facility is located entirely in a new building or uses a portion of Building 221–F. Thus, there is no longer any advantage associated with the use of Building 221–F at SRS.

Changes Resulting From the MOX Procurement Process. As stated in the *Supplement*, information provided as part of the MOX procurement process relating to the MOX facility, including the addition of a plutonium-polishing module to the front end of the MOX facility, was analyzed by DOE in an Environmental Critique and summarized in an Environmental Synopsis prepared pursuant to DOE’s NEPA regulations in 10 CFR 1021.216. The Synopsis was included in the *Supplement* and has been added to this SPD Final EIS as Appendix P. Appendix N, *Plutonium Polishing*, has been deleted from this SPD Final EIS, with the information in Appendix N incorporated into the body of the EIS. A description of the polishing module has been added to Section 2.4.3, and the impacts analysis has been incorporated into Chapter 4 of Volume I. The polishing step is included in the MOX facility, so plutonium polishing is no longer considered as a contingency for the pit conversion facility.

As described in the *Supplement*, the size of the MOX facility has increased. The larger MOX facility is described in Volume I, Chapter 2, of this SPD Final EIS, and the associated environmental impacts are presented throughout Chapter 4. No changes have been made in the amount of material proposed to be made into MOX fuel, the facility’s throughput, or in the overall process to be used to fabricate the fuel.

Information related to the affected environment for the specific domestic commercial reactors that would irradiate the MOX fuel was provided in the *Supplement* and has been added to this SPD Final EIS as a new Section 3.7. Environmental impacts analyzed for the actual reactor sites was also provided in the *Supplement* and has been added to Section 4.28 of this SPD Final EIS.

Possible Delay of the Construction of the Actinide Packaging and Storage Facility. As stated in the *Supplement*, the schedule for the Actinide Packaging and Storage Facility (APSF) is uncertain at this time, and therefore, the disposition facilities at SRS analyzed in this SPD Final EIS were modified to disregard any benefit to the proposed facilities as a result of APSF being present. Chapter 4 of Volume I presents the environmental impacts that would be associated with the construction and operation of surplus plutonium disposition facilities at SRS that are stand-alone and include no reliance on storage space or other functions at APSF. Throughout this SPD Final EIS, references to APSF have been qualified by the phrase “if built,” and no credit has been taken in the environmental analyses for the presence of APSF.

Pit Repackaging Requirements. This SPD Final EIS was changed to reflect new decisions on the repackaging of pits at Pantex for long-term storage and the impacts of that decision on the need to repackage the pits for offsite transportation.

Pit repackaging for long-term storage. As discussed in the *Supplement*, work is currently under way to repackage all pits at Pantex from the AL–R8 container into the AL–R8 sealed insert (SI) container for long-term

storage,³ as described in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This effort would be completed over 10 years, and the estimated dose to involved workers received from this repackaging activity would be about 104 person-rem. The SPD Draft EIS analyzed repackaging of the pits in an AT–400A container. The change to the AL–R8 SI changes the undisturbed long-term storage period for pits from 50 to 30 years because of the need to replace a seal in the container after 30 years; the AT–400A does not require that activity. This change has been incorporated into Chapter 4 of Volume I.

Pit repackaging for offsite transportation. The AL–R8 SI is not an offsite shipping container as was the AT–400A analyzed in the SPD Draft EIS. Therefore, if the decision were made to site the pit conversion facility at a site other than Pantex, the surplus pits would have to be taken out of the AL–R8 SI and placed in a shipping container.⁴ This operation would also require the replacement of some pit-holding fixtures to meet transportation requirements. It is expected that this change would result in a total repackaging dose to involved workers of 208 person-rem. If the decision were made to locate the pit conversion facility at Pantex, then the pits could be moved from their storage location to the pit conversion facility in the AL–R8 SI using onsite transportation vehicles. Under this option, there would be no increased exposures due to repackaging. This change has been incorporated into Chapter 4 of Volume I.

Environmental Impacts Associated With MOX Fuel Versus LEU Fuel. Section 4.28.3 was added to this SPD Final EIS to address the impacts associated with using MOX fuel versus LEU fuel in existing commercial reactors.

Uranium Conversion Impacts. Section 4.30.10, Incremental Impacts Associated With Uranium Conversion, was added to address potential impacts of the conversion of depleted uranium hexafluoride to uranium dioxide. (See Sections 1.5, 2.4.4.2 and 2.4.4.3 for a discussion on conversion.)

New/Revised Documents and Changes to Cumulative Impacts. Section 1.7 of the SPD Draft EIS, Relationship to Other Actions and Programs, (Section 1.8 in this Final) was updated to reflect new or revised planning documents and related NEPA documents, such as the *Environmental Assessment for the Parallel Project Fuel Manufacture and Shipment*, the *ROD for the Department of Energy's Waste Management Program: Treatment of Non-Wastewater Hazardous Waste*, the *Advanced Mixed Waste Treatment Project Final EIS* and ROD, and the *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* and RODs. The information in the most recent and programmatic site documents has been used to update the discussion of cumulative impacts in Section 4.32 of this SPD Final EIS. In addition, cumulative impacts information has been added for LLNL and LANL (two candidate sites for lead assembly fabrication), ORNL (a candidate site for postirradiation examination), and the three reactor sites (Catawba, McGuire, and North Anna).

³ DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been determined (e.g., whether additional magazines need to be air-conditioned). The analysis in this document assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

⁴ At the present time, DOE is using the FL container for the offsite shipment of pits. There are not enough of these containers to meet the plutonium disposition mission. No new FL containers can be manufactured because of certification restrictions. Further, the current FL containers cannot be certified for a specific type of surplus pit. The Defense Nuclear Facilities Safety Board, in its Recommendation 99–1 (August 1999), noted that there is no container suitable for shipping pits from Pantex. Should DOE make any decisions that would require shipment of pits from Pantex, DOE would ensure the availability of a certified shipping container in a timeframe that would support those decisions.

Affected Environment. Information on the affected environment for ORNL, a candidate site for postirradiation examination, has been added to Volume I, Chapter 3, of this SPD Final EIS.

Consultations. Appendix O was added to provide the correspondence related to ecological resources, cultural resources, and Native American consultations. Table 5–2 provides a summary of these consultations, and Section 4.26 discusses the results of the consultations.

Fast Flux Test Facility. Appendix D of the SPD Draft EIS was deleted. This SPD Final EIS does not address using the Fast Flux Test Facility (FFTF) because the current DOE proposals do not include the use of surplus plutonium as a fuel source for FFTF.

Comment Response. Volume III, the Comment Response Document, was added to this SPD Final EIS. The comments received during the two comment periods and their responses are presented in a side-by-side-format.